Mr. Alpert’s Advanced Physics

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**Introduction to Electrostatics Video by Walter Lewin**

Walter Lewin was a Professor of Physics at MIT. The video you will watch is one of his introductory lectures on Electrostatics. You should be able to understand most of his notes even though you have not read that part of the chapter.

1. The proton is how much larger than the electron?
2. What charges do they both have?
3. Dr. Lewin begins the lecture by showing that the nucleus of an atom is on the order of 10^-12 while the radius of the atom, showing the location of the electron is 10^-8. Why is this important?
4. What does the Greek word, “electron” mean?
5. What is the difference between a conductor and an insulator? Some are not bound, can wander around in a conductor not so in an insulator.
6. What did Benjamin Franklin do?
7. What did he get wrong?
8. What is charging by induction?
9. What is the conservation of charge?
10. How is induction of an electric charge like polarization? (not polarized light)
11. If insulators have tightly bound electrons, why are they affected by static electricity? Can their atoms be polarized?
12. What does “r” roof stand for?
13. What is the formula for the force between two charges q1 and q2?
14. What is the charge on one electron?
15. What is the value of “K” ?
16. Dr. Lewin contrasts the electron structure of conductors to that of insulators. What is the difference in how they become charged by static charges?
17. Dr. Lewin spends a great deal of time relating the formula for gravitational attraction to that of electrostatic attraction/ repulsion. He notes that the forces due to electrostatics are much stronger than those of gravity. Why don’t we use static electricity to move things or why is gravity the dominant force on earth rather than static electricity?
18. When Dr. Lewin “beat Simon” with cat fur, what was he proving?
19. Dr. Lewin ends the lesson with a comparison of earth’s gravitational pull on the moon to the forces holding an atom together. What did he conclude?